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NON-SPILLABLE BEVERAGE CONTAINER AND STRAW

RELATED APPLICATIONS

[0001] This application is a divisional application of a co-pending U.S. Patent Application (Serial No. 09/829,893) entitled "NON-SPILLABLE BEVERAGE CONTAINER," filed April 10, 2001 in the names of Hongbiao Li.

BACKGROUND OF THE INVENTION

Technical Field of the Invention

[0002] This invention relates to beverage containers and, more particularly, to a beverage container having a cover preventing the inadvertent spillage of liquids contained within the beverage container.

Description of Related Art

[0003] It is quite common for a beverage container to be accidentally tipped over, causing the liquid contents of the beverage container to spill out of the interior of the beverage container. Many

times the beverage container is utilized in an area where it is particularly undesirable to spill the contents, such as within the interior of an automobile. In addition, the problem of spillage is particularly acute when dealing with children. Children tend to be clumsy and not as cautious as adults, resulting in even a greater risk of spillage of the beverage container. A beverage container is needed which provides an effective and economical way of preventing unwanted spillage of the contents of the beverage container.

[0004] Although there are no known prior art teachings of a solution to the aforementioned deficiency and shortcoming such as that disclosed herein, prior art references that discuss subject matter that bears some relation to matters discussed herein are U.S. Patent Number 4,441,640 to Lottick (Lottick), U.S. Patent Number 5,018,635 to Whittaker (Whittaker), U.S. Patent Number 5,048,705 to Lynd et al. (Lynd), and PCT Patent Application Number PCT/CA92/00170 to Castro (Castro).

[0005] Lottick discloses a non-spillable drinking container having a resiliently flexible material with a drinking straw sealably mounted therethrough. The drinking straw is moveable toward and away from the bottom of the container. The lower end of the drinking tube is provided with an elastic diaphragm connected to the bottom of the container. Tension on the drinking straw away from the bottom of the container

causes the lower end of the tube to be lifted away from the bottom and perforations in the diaphragm to be stretched open to allow fluid flow through the perforations in the diaphragm and out through the drinking straw. In the absence of tension being applied to the drinking straw causes it to be pulled away from the bottom of the container. Holding the container upside down or the application of pressure on the walls of the container will not cause liquid to leak from the non-spillable drinking container. Although Lottick utilizes the diaphragm to prevent the exit of liquids located in the container, Lottick does not teach or suggest utilizing the second opening to regulate the fluid exit from the container.

[0006] Whittaker discloses a fluid containment and access device for use with a beverage container having an upper beaded rim and an opening for flow of the contents from within the volume of the container. Additionally the device includes a flexible lid, an integral straw, and a vent with a closure. The lid fits securely upon the top of the beverage container to form a fluid-tight seal. The straw has a first end extending above the lid and a second end that extends through the opening substantially to the bottom of the container. The vent closure is moveable between a first position to permit the flow of air into the container and a second position to prevent the flow of air into the beverage container. Again, although Whittaker discloses a beverage container having two openings, a straw, and a means for opening and

closing the second opening to allow or prevent the flow of fluids from the straw, Whittaker does not teach or suggest the opening and closing of the second opening by inhaling through the straw. Whittaker requires the manual opening and closing of the second opening.

[0007] Lynd discloses a bottle and drinking tube assembly for dispensing liquids. The bottle has an open top body formed from a resilient plastic material and adapted to be collapsed upon application of moderate hand pressure and a cap for closing the top through which the bottle is filled. An aperture is formed in the cap for receiving an elongated drinking tube that extends to the bottom of the bottle and has an end exterior of the bottle from which the liquid is discharged. A fluid seal is formed between the cap and tube. A selectively operable venting valve is also provided in the cap to alternately permit airflow into the bottle enabling the user to sip the liquid through the tube or to prevent fluid outflow from the bottle when the bottle is collapsed to forcibly expel liquid through the tube. Additionally, Lynd discloses a container having two openings which includes an openable vent located at the second opening. However, Lynd suffers from the disadvantage of requiring the manual opening and closing of the vent, rather than the opening of the vent being regulated by the user's inhalation.

[0008] Castro discloses a non-spillable drinking cup having a perforated cover and an internally and resiliently hinged flap for closing

the perforation in the cover. The perforation is located adjacent the periphery of the cup for allowing the upper lip of the user to downwardly press the cover to open the perforation. Additionally, the cover cup includes a vent which opens when the user is pressing against the cover with his lip. However, Castro does not teach or suggest utilizing the inhalation of the user to open the vent. Rather, Castro requires the downward pressure by a user's lip on the cover to open the vent, which can be extremely difficult for children to operate.

[0009] Thus, it would be a distinct advantage to have a device for preventing the inadvertent spillage of liquids from the interior of a beverage container, yet requires no additional manipulation by a user of the beverage container. It is an object of the present invention to provide such an apparatus.

SUMMARY OF THE INVENTION

[0010] In one aspect, the present invention is a non-spillable container. The container includes a beverage container holding a liquid within an interior of the container and a cover attached to the container. The cover includes a straw opening sized to accommodate a straw and a vent opening having selectably closing means for preventing the passage of liquid and air through said opening. A straw is inserted within the straw opening. The straw includes a straw having a closeable orifice

running longitudinally through a length of the straw. When the orifice is closed, the liquid is prevented from passing through the straw. When a user inhales through the straw, the orifice is opened to allow the passage of liquid through the orifice. The vent opening is biased closed when a user is not drinking from the container and opens when the user inhales through the straw causing the vent opening to be opened and liquid to pass through the straw.

[0011] In another aspect, the present invention is a selectably closeable straw for use on a beverage container. The straw includes a straw having a closeable orifice running longitudinally through a length of the straw. When the orifice is closed, the liquid is prevented from passing through the straw. When a user inhales through the straw, the orifice is opened to allow the passage of liquid through the orifice.

[0012] In still another embodiment, the present invention is a non-spillable container. The container includes a beverage container holding a liquid within an interior of the container and a cover. The cover includes a straw opening sized to accommodate a straw and a vent opening having a diaphragm covering the vent opening. The diaphragm is biased to a closed position to prevent the passage of air through the opening. In addition, a straw is inserted within the straw opening. The vent opening is biased closed when a user is not drinking from the

container and opens when the user inhales through the straw, causing the diaphragm to open and allow the passage of air through the vent opening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The invention will be better understood and its numerous objects and advantages will become more apparent to those skilled in the art by reference to the following drawings, in conjunction with the accompanying specification, in which:

[0014] FIGs. 1A and 1B are front perspective views of the container having a cover in the preferred embodiment of the present invention;

[0015] FIG. 2 is a top view of the cover removed from the container in the preferred embodiment of the present invention;

[0016] FIG. 3 is a top view of the cover in an alternate embodiment of the present invention;

[0017] FIG. 4 is a front perspective view of the cover removed from the container in a second alternate embodiment of the present invention;

[0018] FIG. 5 is a front perspective view of the cover in a third alternate embodiment of the present invention;

[0019] FIG. 6 is a front perspective view of FIG. 5 with the petals opened outwardly when a user is drinking in the third alternate embodiment of the present invention;

[0020] FIG. 7A is a front perspective view of the straw illustrating a fourth alternate embodiment of the present invention; and

[0021] FIG. 7B is a front perspective view of the straw of FIG. 7A illustrating the sections in an open position.

DETAILED DESCRIPTION OF EMBODIMENTS

[0022] The present invention is a beverage container preventing the inadvertent spillage of liquids contained within the interior of the beverage container. FIGs. 1A and 1B are front perspective views of the container 20 having a cover 22 in the preferred embodiment of the present invention. The cover 22 includes a straw opening 24 having a straw 26 inserted within the opening. The cover 22 also includes an orifice 28 covered by a diaphragm 30. Additionally, seepage from an area around the outer surface of the inserted straw and the straw opening may be optionally prevented by use of a conventional sealing device 32 common in some types of beverage container/straw combinations.

[0023] The cover 22 may be constructed of any material preventing the seepage of liquids contained in the beverage container 20. In the preferred embodiment of the present invention, the cover is constructed of a conventional plastic material commonly used in beverage container covers. Additionally, the straw 26 may be constructed and configured similarly to any conventional straw used in existing beverage containers.

For the present invention to work in its best mode, the cover 22 must provide an air tight seal between the cover and the container to prevent air flow through the edges of the cover. The beverage container may be any shape and constructed of any material which allows liquid to be container within the interior of the container.

[0024] FIG. 2 is a top view of the cover 22 removed from the container 20 in the preferred embodiment of the present invention. The diaphragm 30 covers the orifice 28 and is constructed of a material preventing the transfer of liquid and air contained within the container from exiting through the orifice. In the preferred embodiment of the present invention, the diaphragm is constructed of an elastomeric material or any flexible material. The diaphragm 30, in the preferred embodiment of the present invention, is affixed to the cover 22 on two edges 42a and 42b of the orifice. Preferably, the edges 42a and 42b are affixed by a glue substance, however, the diaphragm may be affixed to the orifice in various configurations. Alternatively, the diaphragm may be integrally constructed with the cover. In various other embodiments, the diaphragm may be affixed to different points on the edges of the orifice. Additionally, the orifice, as well as the diaphragm may be any shape (e.g., square, triangle, etc.). In the preferred embodiment of the present invention, the diaphragm allows air to enter the interior of the

container when a user inhales through the straw 26 (with the cover attached to the container 20).

[0025] With reference to FIGs. 1 and 2, the operation of the container 20 and the cover 22 will now be explained. A beverage is contained within the interior of the container 20. The cover 22 is affixed to the top of the container in a conventional manner, preferably forming an air tight seal. The straw is inserted through the straw opening 24. Preferably, the sealing device 32 or any other sealing device is used to prevent seepage of the liquid from exiting from around the outer surface of the straw and the straw opening. The diaphragm 30 covers the orifice 28. When the cover is placed on the container, an air tight seal between the outer edges of the cover and the upper portion of the container is preferably created. Additionally, since the orifice 28 is covered, the passage of air is prevented through the orifice. The closure of the orifice prevents liquid from exiting through the straw. By preventing the passage of air through all openings except the straw, liquid is prevented from exiting via the straw.

[0026] When a user of the container 20 wishes to drink, the user inhales and sucks on the straw 26. By drawing air through the straw from the interior of the container, the air pressure within the interior of the container is decreased. Additionally, the diaphragm is sucked inwardly toward the interior of the container. Since the diaphragm is

only attached at one or more points on the orifice 28, the diaphragm flexes downwardly and air is allowed to enter the interior of the container through points of the diaphragm not attached to the orifice. By allowing air to enter the interior of the container, the user can easily draw out liquid from the container via the straw. Once the user discontinues inhaling on the straw, the air pressure within the interior of the container is equalized with the outside pressure, thereby allowing the diaphragm to return to its original position (i.e., flat against the orifice 28). The diaphragm then prevents air from entering or exiting the interior of the container through the orifice 28. Additionally, as discussed above, the liquid is prevented from exiting through the straw 26. Thus, when the container is not being used for drinking, no liquids may exit from the container. Additionally, the user can automatically drink from the container by merely inhaling (sucking) on the straw. Thus, no additional manipulation is required by the user.

[0027] FIG. 3 is a top view of the cover 22 in an alternate embodiment of the present invention. In this configuration, the diaphragm 30 includes two cross slits 44. The slits may allow the passage of air through the orifice while preventing the passage of liquid from exiting through the orifice. Alternatively, the diaphragm may have just one slit. Additionally, the diaphragm may be completely connected

with the orifice, rather than only being connected at specific points along the edge of the orifice, as discussed for FIG. 2.

[0028] Referring to FIG. 3, the operation of this alternate embodiment will now be explained. As discussed above, the cover 22 is affixed to the top portion of the container 20. The straw 26 is inserted into the straw opening 24. The diaphragm 30 covers the orifice 28. Without the user inhaling on the straw, the contents of the container cannot exit through the straw. The diaphragm prevents air from entering the interior of the container, which prevents any liquid from exiting through the straw. Additionally, the diaphragm prevents the exit of any liquid through the orifice 28. When the user desires to drink, the user inhales through the straw, thereby causing air to be sucked outwardly from the interior of the container. This outflow of air causes the slits 44 to be drawn downwardly, thus providing an opening of the orifice 28. With the orifice opened, air may enter the interior of the container. By allowing the air to enter the interior of the container, liquid may be drawn out through the straw by the user. When the user discontinues use of the straw, the diaphragm returns to its original position (i.e., closed). Thus, in the closed configuration, no liquids may exit from the container.

[0029] Alternatively to utilizing the orifice 28, the cover may include a covering 29 with a plurality of small holes 31. The covering 29 may be constructed of an elastomeric material. When the user is not

inhaling through the straw 26, the covering 29 is in a closed state whereby the holes are closed. When the user inhales through the straw, air is drawn out from the interior of the container, which causes the covering to flex downwardly. The flexing of the covering allows the holes to open and air to pass through the covering. In an alternate embodiment of the present invention, one or more small holes may be located on the cover 22 or on the beverage container 20. The hole or holes must remain in a closed position, yet open when the user inhales through the straw. Any closeable opening may be used which is actuated to an open position upon the inhalation by the user through the straw.

0030] FIG. 4 is a front perspective view of the cover 22 removed from the container 20 in a second alternate embodiment of the present invention. In this version, the orifice 28 includes a downwardly extending tube 50 having a small vent opening 52. The tube provides an opening leading through the vent opening into an interior portion of the beverage container (when the cover is attached to the container). The tube opening includes a diaphragm 54 covering the vent opening 52. The diaphragm 54 may be affixed in the same manner as diaphragm 30 (i.e., affixed at one or more points along an edge of the vent opening). The diaphragm 54 is preferably constructed of a flexible material preventing the passage of liquids and air when in the closed position.

[0031] The embodiment illustrated in FIG. 4 also works in a similar fashion as discussed for FIGs. 1-3. The cover 22 is attached to the container 20, forming an air tight seal. The orifice is covered by the tube 50 extending into the interior of the container. The tube includes the vent opening 52, which is covered by the diaphragm 54. As with the diaphragm 30, the diaphragm 54 is preferably only partially affixed to the vent opening. When the user is not inhaling through the straw 26, the diaphragm 54 completely covers the vent opening 52, thus preventing the exit of liquids within the container and the entrance or exit of air. By preventing the flow of air through the vent opening, the liquids contained within the interior of the container cannot exit through the straw. When the user inhales through the straw, air is drawn from the interior of the container, causing the diaphragm to bend inwardly. This inward pull of the diaphragm 54 allows air to pass through the vent opening. With the allowance of the passage of air through the vent opening, liquid contained within the container may then be drawn out through the straw by the user.

[0032] FIG. 5 is a front perspective view of the cover 22 in a third alternate embodiment of the present invention. In this alternate embodiment, the orifice 28 includes a plurality of openable petals 60. Although FIG. 5 illustrates two petals, any plurality of petals may be used. FIG. 5 illustrates the petals in the closed position, preventing the

passage of liquids or air flow. In the closed position, no liquids or air passes through the orifice 28. The petals are biased to the closed position.

[0033] FIG. 6 is a front perspective view of FIG. 5 with the petals 60 opened outwardly when a user is drinking in the third alternate embodiment of the present invention. As illustrated, when the user inhales through the straw 26 (not shown in FIG. 6), the air pressure within the interior of the container 20 is decreased, thereby causing the expansion (opening of the petals 60). This opening of the orifice 28 allows any liquid contained in the container 20 to be sucked out through the straw. When the user discontinues inhaling through the straw, the petals return to their biased closed position, preventing the passage of air through the orifice.

[0034] The tubes 52 and 60 may be integrally formed with the cover 22 or provide as separate inserts attached through the orifice 28. In alternate embodiment of the present invention, the tubes may be located on the beverage container side walls, rather than the cover.

[0035] FIG. 7A is a front perspective view of the straw 26 illustrating a fourth alternate embodiment of the present invention. The straw includes expandable sections 70. FIG. 7A illustrates the sections in the closed position. FIG. 7B is a front perspective view of the straw 26 of FIG. 7A illustrating the sections 70 in the open position. The straw

26 may be used with the cover 22 having the orifice 28 or with any conventional cover for a beverage container. The sections are pivoted and biased to a closed position depicted in FIG. 7A. The straw 26 provides additional protection against accidental leakage of liquids contained within the container.

[0036] In operation (referring to FIGs. 7A and 7B), when the user is not inhaling through the straw, the sections 70 are collapsed to the closed position. In this position, liquid may not pass through the straw. When a user desires to draw liquid through the straw, the user inhales and sucks liquid through the straw. The outflow of air through the straw causes the sections 70 to expand outwardly, allowing the liquid to pass through the straw. When the user discontinues inhaling through the straw, the sections return to their original closed position, thereby preventing the flow of liquids through the straw. Although sections are illustrated in FIGs. 7A and 7B, any closeable orifice which opens with the inhalation of air through the straw may be utilized to prevent the flow of liquid through the straw. Additionally, the sections may be an inserted or integrally connected with the interior of the straw.

[0037] The container and cover of the present invention provide many advantages over existing beverage/cover system. The container allows a user to confidently lay their beverage container down without the fear of spilling liquid contained within the container. Specifically,

the container is biased to prevent any liquid from spilling from the container. In order to drink from the container, the user merely has to inhale through the straw. The cover 22 allows liquid to pass through the straw automatically by the user inhaling through the straw. Existing beverage containers requires the user to manually open and close openings when drinking is desired. With the cover 22, the user merely inhales through the straw to allow liquid to pass through the straw. When the user is finished drinking, the container automatically returns to a closed position preventing the passage of liquid from the container.

Thus the user need not perform any additional manipulation to open or close the beverage container.

[0038] Additionally, the present invention provides additional security against leakage from the straw by utilizing collapsible sections to prevent the undesired passage of liquid through the straw. Again, when the user wishes to drink, the user merely inhales on the straw to allow passage of the liquid. The sections automatically close when the user discontinues use of the straw.

[0039] It is thus believed that the operation and construction of the present invention will be apparent from the foregoing description. While the apparatus shown and described has been characterized as being preferred, it will be readily apparent that various changes and

modifications could be made therein without departing from the scope of the invention as defined in the following claims.